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ATMI, INC.  
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EXAMINER

SONG, MATTHEW J

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 09/15/2003

6

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/929,789

Applicant(s)

TISCHLER ET AL.

Examiner

Matthew J Song

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 01 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 39-76 is/are pending in the application.
- 4a) Of the above claim(s) 39-60, 62, 68, 69 and 72-76 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 61, 63-67, 70 and 71 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

***Election/Restrictions***

1. Applicant's election with traverse of Group II, claims 61-67 and 70-71 in Paper No. 5 is acknowledged. The traversal is on the ground(s) that the restriction is based on previously cancelled claims and not the preliminary amendment, where claims 39-60 are pending. This is not found persuasive because the restriction is based on the pending claims 39-76, filed as amendment B on 7/1/2003, which are different from the claims referred to in the traversal. The currently pending claims 39-76 in this application contain both process and product claims; therefore the two inventions are restrictable because of their different classification.

The requirement is still deemed proper and is therefore made FINAL.

2. Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 61, 63-67 and 70-71, drawn to a method, classified in class 117, subclass 84.
- II. Claim 62, drawn to a product, classified in class 257, subclass 615.

3. The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case

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process as claimed can be used to make other and materially different products, such as one with defects.

4. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

5. During a telephone conversation with Steven Hultquist on 8/27/2003 a provisional election was made with traverse to prosecute the invention of Group I, claims 61, 63-67 and 70-71.

Affirmation of this election must be made by applicant in replying to this Office action. Claim 62 is withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

***Priority***

6. An application in which the benefits of an earlier application are desired must contain a specific reference to the prior application(s) in the first sentence of the specification of in an application data sheet (37 CFR 1.78(a)(2) and (a)(5)). The specific reference to any prior nonprovisional application must include the relationship (i.e., continuation, divisional, or continuation-in-part) between the applications except when the reference is to a prior application of a CPA assigned the same application number.

***Double Patenting***

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7. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

8. Claims 61, 63-67 and 70-71 are rejected under the judicially created doctrine of double patenting over claims 1-18 of U. S. Patent No. US 5,679,152 since the claims, if allowed, would improperly extend the "right to exclude" already granted in the patent.

The subject matter claimed in the instant application is fully disclosed in the patent and is covered by the patent since the patent and the application are claiming common subject matter, as follows: US 5,679,152 claims a method of making a single crystal GaN comprising growing GaN over a sacrificial base material of gallium arsenide (GaAs) and etching away the sacrificial base to recover the GaN, note claims 1-2. US 5,679,152 is silent to the substrate is heterogeneous to GaN, however US 5,679,152 teaches similar GaAs substrate, which is inherently heterogeneous to GaN.

Referring to claim 63, US 5,679,152 teaches an intermediate layer comprises silicon, note claims 6-7, or a strained superlattice, note claims 8-9

Referring to claim 64, US 5,679,152 teaches an intermediate layer comprises a superlattice of two materials selected from the group consisting of AlN, InN, GaN and alloys of

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SiC with one or more AlN, InN and GaN, note claims 8-9. US 5,679,152 is silent to the superlattice is a buffer layer, however a strained superlattice of similar materials is well known in the art to inherently act as a buffer layer, note pg 8 of the instant specification.

Referring to claim 65-67, US 5,679,152 claims an intermediate layer of epitaxially related crystalline material, note claim 6. US 5,679,152 is silent to the intermediate layer includes a template layer, a protective layer or a etch stop layer. However, these limitations are considered to be intended use limitations and a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. The epitaxially related crystalline material would be capable of performing the claimed intended use.

Referring to claim 71, US 5,679,152 claims the GaAs base is etched away in situ from the layer at or near the growth temperature, note claim 1 and col 3, ln 60-62. US 5,679,152 is silent to within 300°C of the growth temperature. It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify US 5,679,152 by optimizing the temperature by conducting routine experimentation of a result effective variable. Also, the selection of reaction parameters such as temperature and concentration is obvious (In re Aller 105 USPQ 233, 255 (CCPA 1955)).

Furthermore, there is no apparent reason why applicant was prevented from presenting claims corresponding to those of the instant application during prosecution of the application which matured into a patent. See *In re Schneller*, 397 F.2d 350, 158 USPQ 210 (CCPA 1968). See also MPEP § 804.

*Claim Rejections - 35 USC § 102*

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. Claims 61, 63-67 are rejected under 35 U.S.C. 102(e) as being anticipated by Akasaki et al (US 5,846,844).

Akasaki et al discloses a method of producing a single crystalline substrate (col 1, ln 55-67) comprising sapphire substrate 1, this reads on applicant's heterogeneous substrate, an intermediate ZnO layer 2 and a GaN semiconductor layer 3 (col 2, ln 30-67). Akasaki et al also discloses the intermediate layer was etched off and the GaN semiconductor layer was peeled off from the sapphire substrate 1 (col 3, ln 1-67).

Referring to claim 64-67, Akasaki et al is silent to the intermediate layer includes a buffer layer, a template layer, a protective layer or an etch stop layer. However, these limitations are considered to be intended use limitations and a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. The ZnO layer would inherently be capable of performing the claimed intended use.

***Claim Rejections - 35 USC § 103***

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. Claim 70-71 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gmitter et al (US 4,883,561) in view Akasaki et al (US 5,846,844).

In a method of forming epitaxial films, note entire reference, Gmitter et al teaches a method of removing an epitaxial film from a single crystal substrate comprising a single crystal GaAs substrate having a thin release film 2 and epitaxially growing GaAs layers 3 and 4, thereon (col 3, ln 35-55). Gmitter et al also teaches selectively etching the release layer to separate the substrate from the epitaxial film (col 2, ln 25-41 and col 4, ln 1-67). Gmitter et al also teaches

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other III-V compounds, II-VI compounds and even more general material systems should be useable with the invention (col 10, ln 40-48).

Gmitter et al does not teach a growing GaN, which is a well-known III-V semiconductor. Gmitter et al does teach other III-V compounds may be used.

Akasaki et al discloses a method of producing a single crystalline substrate (col1, ln 55-67) comprising sapphire substrate 1, this reads on applicant's heterogeneous substrate, an intermediate ZnO layer 2 and a GaN semiconductor layer 3 (col 2, ln 30-67). Akasaki et al also discloses the intermediate layer was etched off and the GaN semiconductor layer was peeled off from the sapphire substrate 1 (col 3, ln 1-67). It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Gmitter et al with Akasaki et al's III-V semiconductor layer of GaN because GaN is a useful semiconductor ('844 col 1, ln 15-55)

Referring to claim 71, the combination of Gmitter and Akasaki does not teach the claimed temperature of the etching. It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Gmitter et al and Akaski et al by optimizing the temperature to obtain same by conducting routine experimentation of a result effective variable (MPEP 2144.05). Furthermore, the selection of reaction parameters such as temperature and concentration is obvious (In re Aller 105 USPQ 233, 255 (CCPA 1955)).

### *Conclusion*

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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Hata (US 5,970,080) teaches InN is a well known etch stop layer for GaN devices (col 2, ln 1-67).

Gmitter et al (US 4,846,931) teaches a thin release film (Abstract).

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J Song whose telephone number is 703-305-4953. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 703-305-2667. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Matthew J Song  
Examiner  
Art Unit 1765

MJS

NADINE G. NORTON  
PRIMARY EXAMINER

